ASPECTS OF THE INTERNATIONAL EXCHANGE OF WATER INFORMATION

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It is estimated that over 60 million pages of scientific and technical literature, distributed through 80,000 regular journals and 300,000 monographs, are printed in the world annually and that this figure is doubling every twelve years (1, 2). This wealth of information is a characteristic of today's world - the information age.

These figures can be especially disconcerting for those in the ubiquitous field of water. Water is a topic that falls into many subject areas, disciplines and missions, with the result that information generated from its study is scattered throughout the glut of today's literature. This problem is compounded by the fact that much of the information generated by water engineers, technicians and scientists is not published in books and journals available through booksellers and libraries, and is therefore inaccessible through regular information transfer channels. A specialist in the subject field can reflect on the proportion of studies and consultants' reports that find their way into the published literature. The majority of reports are distributed amongst the engineers and planners involved in the study and their close colleagues to end up in private offices and bookshelves.

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Such reports then become primary sources of information within the same college of people. In fact, there exists in the water field a type of information nepotism.

Within such an environment, the search for more knowledge goes on, and more information continues to be generated with little attention paid to its proper utilization. Is the information produced by the field worker and engineer reaching the policy makers and planners or others faced with a similar problem? Does it have the desired effect on the decision-making process; or is it simpler to undertake or implement new studies when faced with a problem? Only rarely is there an attempt to find out how a problem was approached and managed in a similar region. This lack of concern for information handling is widening the gap between available knowledge and program practices (3), and is contributing to the increasing amount of time it takes to implement a project or program. For example, twenty years ago it took one and a half years to decide to implement an idea, e.g. building a hydro dam. The time interval has now increased to over eleven years (4). With no mechanism to exchange information and experiences on a regular timely basis, the transfer of knowledge will become more unmanageable as time goes on.

The Present Scene

In any general discussion about information systems, a distinction must be made between the collection and reporting of quantitative data and the collection and reporting of knowledge, that is, methodologies,

techniques, and experiences. This paper concerns itself primarily with the second aspect: the collection and reporting of knowledge.

It is generally acknowledged that despite efforts throughout the world for improving the flow of information, more must be done to systematically serve the wide range of potential users (5), particularly users in developing countries. Much can be done and we have several international experiences that perhaps point the way, if not to final solutions of the problems, at least to mechanisms for solving them (6, 7, 8, 9, 10, 11, 12, 13). In the water field, the demand for new and better information is rapidly increasing; the will to cooperate exists, but there is no international mechanism for exchanging information and transferring knowledge.

However, there are many good water information systems at the national and regional levels that already exist or are being planned. For example, there is the Water Resources Document Reference Centre in Canada (14, 15), the Water Resources Scientific Information Center in the U.S. (16), the Water Research Centre in England (17), the National Engineering and Environmental Engineering Research Centre in India (18), the Asian Institute for Technology in Bangkok (19) and a planned Western Pacific Environmental Sciences and Engineering Centre. In Latin America, the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS) in Peru is implementing a Latin American regional network with sub-regional and national centres (20). Cooperating with CEPIS is Companhia Estadual de Tecnologia de Saneamento Basico e de Defesa do Meio Ambiente in Brazil and Escuela Regional Ingeniria Sanitaria in Guatemala who are planning sub-regional centres. In Africa, some

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excellent regional information centres are run by l'Office de la Mise en Valeur du la Fleuve Sénégal (21), the River Niger Commission (22) and the Comité Inter-Africain d'Etudes Hydrauliques (23).

In the private sector, there are also many commercial information activities in the information market place relevant to water. These include such indexing, abstracting and data base services as:

Oceanic Abstracts

Pollution Abstracts

Solid Waste Management

Biological Abstracts - BIOSIS

Chemical Abstract Condensates

Engineering Index - COMPENDEX

These are but a few data bases relevant to water selected from an inventory of over 150 data bases accessible through the Alberta Research Council's information centre (24). Direct access through computer terminals to such data bases is sold through commercial suppliers (25, 26, 27). However, it is well known that commercial data bases cover primarily the published or conventional literature. But because much of the information generated in the water field is not published, commercial data bases must be supplemented by private or cooperative data bases covering the non-conventional information.

Other information handling developments are taking place in the water field through associations recognizing the need for some type of international programme and coordinated information handling efforts. For example, there is the Ad Hoc Working Group for Rural Potable Water

Supplies and Sanitation, a consortium of nine international organizations, presently defining an international programme to accelerate the development of water supply and sanitation services in rural areas (28). One of the basic components identified in their programme, which includes training, education and management, is information. The Association of Geoscientists for International Development have also recognized the need for proper information handling procedures. They have recently prepared a preliminary groundwater bibliography for developing countries (29) and are presently carrying out a state-of-the-art survey of information for geohydrology.

An International Information System

A commonly accepted definition of an international information system is a system (30, 31):

- open to participation of all countries, each with a say in its management;
- to which each country provides input according to its wealth measured by its production of information within its territory; and
- from which each country receives output in the form of products and services which it can use to meet its needs measured by its requirements for information.

The international system's first purpose is to support national services.

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The model for such a system is fairly simple. Each country agrees to submit in an agreed standard form to an international coordinating centre the records of published and unpublished documents generated within its national boundaries. It also agrees to provide copies of all referenced non-published items. The international centre verifies the editing of the records it receives, merges them with the records received from all participating countries to produce periodic indexes and bibliographies, and produces microfiche. Copies of all merged material and documents are then distributed to the participating centres at the regional or national level. Each participating centre is then responsible for disseminating the information within its borders in whatever way it sees fit.

This model by itself does not get the information into the minds of the ultimate users. It must be linked to the related activities of investigation, education, demonstration and extension. Ideally, an information system provides a service to which an individual can address a question and which then gives an answer in the right form at the right level at the right time and based on the latest and most accurate information. However, most information systems, as the term is often used, only respond to questions by referring to particular pieces of documentation or other sources where the answers may be found. Although this is an important function, it only makes for half a system. To be truly useful, information must be consolidated. In an information system, this function can be carried out by merging and synthesizing

information on a given subject into the form of specialized bibliographies, handbooks, compendia, state-of-the-art reviews, reports and so on (1). These products are immediately usable by the engineer, the scientist or the extension officer, partners in an information system, who may again repackage them for a final user at a lower level (32, 33, 34, 35, 36).

The present awareness of the need for water information and the apparent institutional will to cooperate are most encouraging; however, experience with other systems has taught that an international information system cannot be realized solely on these factors. A system built to handle information that is generated primarily for or by governmental agencies (national, provincial, municipal), and water information is, also requires the commitment of governments. Without government commitment, information may not be released nor is there assurance that adequate resources of money and manpower will be forthcoming for the national or international parts of the programme.

Efforts to build cooperative international information systems depend on the achievement of a consensus among governments, on the development of the necessary tools, on the training of staff to be involved at the national, regional and international levels, and on the operational experience and the feedback of user response into the management of the entire activity. Only during the last few years have efforts to organize information systems on a world scale been made; now there are several international activities (see bibliography) that provide us with experiences upon which decisions can be based for future systems.

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One of the most important international information activities has been UNESCO's UNISIST programme. UNISIST was established in 1971 to coordinate existing trends towards cooperation between information systems; to act as a catalyst for the promotion of scientific and technical information programmes; to create the necessary conditions for inter-connection between systems; and to facilitate access to world information resources (37). UNISIST's broad goal is to foster the environment within which a loose network of information systems and services can grow out of voluntary cooperation among countries. It promotes common standards and practices for information systems and has created various guides and reference manuals towards this end (38).

Towards an International Information System

There are basically two formulae that can be applied when undertaking a global programme for the development of an international information system. One is where there exists a highly centralized activity in a single international agency with a strong direction. This does not apply in the water field. The other is the decentralized formula in which each institution, in submission to external forces or a desired payoff, commits itself to follow the dictates of a coordinating body on which the participating institutions may, in some cases, be represented. This formula has specific elements that must be present:

a) the support of governments in the design and operation of a global system, for they control much of the information needed for the service;

b) a definition of common norms and a common focus for all participants. Otherwise, efforts can be dispersed and directed more towards the acceleration of separate individual programmes;

c) the establishment of an impartial authority to make decisions on methodology and techniques. This can be based on an existing institution or one specially created;

d) a clear scope definition by subject category or as a detailed list of steps or functions required for obtaining the objective of adequate water supplies and management. Only then is it possible to answer technical questions of systems design and consequently the size of the operation, organization and budgeting required.

Arriving at an international information system would ideally be best achieved by getting an early consensus from governments as to their readiness to become involved in the design and operation of a global information programme. Clearly this would have to be achieved through an intergovernmental body preferably within the United Nations system. But that takes time, and systems in operation and plans for new systems cannot suddenly stop.

An alternative is to combine the top-down approach of working towards government consensus with a bottom-up approach by encouraging the building of national and regional systems within the UNISIST programme. Applying UNISIST standards will implicitly build compatibility between the technical components of the various systems. While national systems are being developed, agreements concerning scope, common norms

and central authority for an international exchange would be in the making. But as in all other endeavours, this requires a leader ready to rise to the challenge and willing to take the initiative. If no such agency exists, the strongest existing national and/or regional centres can pull together to form a lead group; but are there institutions willing to work with one another and to take such a lead? Much lip service has been paid to this question in the past. Now is the time to turn talk into action.

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